

CLAIMS

What is claimed is:

1. A cable comprising:
  - a) a first connector having a print controller ready data interface for receiving print controller ready data (PCRD);
  - b) a second connector having a print engine ready data interface for providing print engine ready data (PERD); and
  - c) a printer controller for receiving the print controller ready data and based thereon for generating print engine ready data.
2. The cable of claim 1 further comprising:
  - a) a cable format conversion mechanism for converting signals in a first format into corresponding signals in a second format.
3. The cable of claim 1 further comprising:
  - a multiple target device support mechanism for supporting at least two different types of target devices.
4. The cable of claim 3 wherein the multiple target device support mechanism further comprises:
  - a) a laser printer interface for providing an interface to laser printers;
  - b) non-impact printer interface for providing an interface to non-impact ink printers; and
  - c) a common formatting circuit coupled to the laser printer interface and the non-impact printer interface for providing functions to the laser printer interface and the non-impact printer interface.
5. The cable of claim 1 wherein the print engine ready data interface includes:
  - a) a first signal for sending commands from the printer controller to the print engine;

- b) a second signal for receiving status from the print engine in response to commands sent  
by the printer controller; and
- c) a third signal for transferring data from the printer controller to the print engine.
6. The cable of claim 5 wherein the print engine ready data interface further includes:
- 5 a) a first user interface signal for sending displayable data to the print engine; and
- b) a second user interface signal for receiving user input from the print engine.
7. The cable of claim 1 wherein the print controller ready data interface includes one of an  
industry standard computer port interface, a parallel port interface, a serial port interface,  
IEEE 1284 parallel port interface, a USB serial port interface, and an Ethernet interface.
8. The cable of claim 1 wherein the print engine ready data (PERD) interface includes one of a  
parallel port interface, a serial port interface, an IEEE 1284 parallel port interface, a USB  
serial port interface, an Ethernet interface, and a custom interface.
9. A printer controller for coupling to a source comprising:
- a) a random access memory for storing a non-resident printer controller program;
- b) a processor for executing computer programs coupled to the random access memory; and
- c) a dynamic loading program for managing the download of the non-resident printer  
controller program to the random access memory.
10. The printer controller of claim 9  
wherein the dynamic loading program, when executing on the processor, selectively
- 20 downloads from the source the non-resident printer controller program to the printer  
controller when it is determined that the current version of the printer controller  
program resident in the random access memory is not valid.
11. The printer controller of claim 9  
wherein the dynamic loading program, when executing on the processor, selectively
- 25 downloads from the source the non-resident printer controller program to the printer

controller when it is determined that the current version of the printer controller program resident in the random access memory is one of non-existent and corrupt.

12. The printer controller of claim 10

wherein the printer controller program, when executing on the processor, receives print controller ready data and based thereon generates print engine ready data for controlling a print engine.

13. The printer controller of claim 9 further comprising:

an integrity check module, when executing on the processor, for performing an integrity check on the printer controller program to determine whether the printer controller program is valid, re-installing the printer controller program from the source when the printer controller program is not valid, performing compatibility tests to determine whether the printer controller program is compatible with the printer controller and a printing software, re-installing the printer controller program from the source when the printer controller program not compatible with the printer controller and the printing software.

14. The printer controller of claim 9 wherein the printer controller is embodied in a single integrated circuit.

15. The printer controller of claim 14 wherein the single integrated circuit is an application specific integrated circuit (ASIC).

16. A method of printing in a system that includes a printer having a print engine, a printer controller external to the printer having a memory for storing a printer controller program, a host having a printing software, the method comprising the steps of:

a) determining whether the printer controller program is loaded in the memory of the printer controller;

b) determining whether the printer controller program is valid;

- c) determining whether the printer controller program is compatible with the print engine, the printing software and printer controller;
- d) sending data to be printed to the printer controller when the printer controller program is loaded, valid, and compatible.

5 17. The method of claim 16 further comprising:

- e) downloading the printer controller program to the printer controller when the printer controller program is one of not loaded, invalid, and incompatible.

18. The method of claim 17 wherein the step of downloading the printer controller program to the printer controller further comprises:

- e1) automatically downloading the printer controller program from the host to the printer controller.

19. The method of claim 17 wherein the step of downloading the printer controller program to the printer controller further comprises:

- e1) automatically downloading the printer controller program from a web site to the printer controller.

20. The method of claim 16 wherein the step of determining whether the printer controller program is valid further comprises:

- performing a cyclic redundancy check on the printer controller program.

21. An office machine comprising:

- a) a print engine for receiving print engine ready data (PERD) and responsive thereto for generating a hard copy of the print engine ready data, the print engine for coupling to a printer controller and for communicating data therewith, wherein the printer controller is disposed external to the office machine; and

- b) a port having a print engine ready data interface for receiving the print engine ready data from the printer controller.

22. The office machine of claim 21 wherein the print engine ready data interface includes:
- a) a first signal for sending commands from the printer controller to the print engine;
  - b) a second signal for receiving status from the print engine in response to commands sent by the printer controller; and
  - c) a third signal for transferring data from the printer controller to the print engine.
23. The office machine of claim 22 wherein the print engine ready data interface further includes:
- a) a first user interface signal for sending displayable data to the print engine; and
  - b) a second user interface signal for receiving user input from the print engine.

09675194-092900